

Claims

What is claimed is:

1. A method for controlling an intake engine valve capable of variable closing timing, comprising:
 - determining a condition indicative of white smoke production;
 - closing the intake engine valve at a first crank angle for a given engine operating condition when the condition indicative of white smoke production does not exist; and
 - closing the intake engine valve at a second crank angle for the given engine operating condition when the condition indicative of white smoke production exists, the second crank angle being less than the first crank angle.
2. The method of claim 1 wherein the condition indicative of white smoke production comprises at least one of:
 - an excess quantity of fuel injected into a combustion chamber;
 - a low intake manifold pressure; and
 - a low engine temperature.
3. The method of claim 2 wherein the low engine temperature comprises a low intake manifold air temperature.
4. The method of claim 1 wherein the given engine operating condition comprises:
 - a first engine speed; and
 - a first fuel quantity.

5. A method for controlling an intake engine valve capable of variable closing timing, comprising:

determining a condition indicative of white smoke production;

closing the intake valve at a first crank angle for a given engine operating condition when a condition indicative of white smoke production does not exist; and

advancing the closing of the intake valve relative to the first crank angle when the condition indicative of white smoke production exists.

6. The method of claim 5 wherein the condition indicative of white smoke production comprises at least one of:

an excess quantity of fuel injected into a combustion chamber;

a low intake manifold pressure; and

a low engine temperature.

7. The method of claim 6 wherein the low engine temperature comprises a low intake manifold air temperature.

8. The method of claim 5 wherein the given engine operating condition comprises:

a first engine speed; and

a first fuel quantity.

9. An apparatus for controlling an intake engine valve capable of variable closing timing, comprising:

at least one sensor operable to determine an engine operating condition indicative of white smoke production, the at least one sensor operable to transmit at least one signal as a function thereof;

an engine valve controller coupled with the at least one sensor to receive the at least one signal, the engine valve controller operable to transmit a first signal indicative of a desired timing for the closing of the intake engine valve as a function of the at least one signal indicative of white smoke production; and

a variable intake valve actuator operable to close the intake engine valve as a function of the first signal.

10. The apparatus of claim 9 wherein the engine valve controller is operable to:

close the intake engine valve at a first crank angle for a given engine operating condition when the condition indicative of white smoke production does not exist; and

close the intake engine valve at a second crank angle for the given engine operating condition when the condition indicative of white smoke production exists, the second crank angle being less than the first crank angle.

11. The apparatus of claim 9, further comprising:
at least one sensor operable to determine a second engine operating condition and to transmit at least one signal indicative thereof; and
wherein the engine valve controller is further operable to transmit the first signal as a function of the at least one signal indicative of the second engine operating condition.

12. The apparatus of claim 11 wherein the second engine operating condition comprises at least one of:
an excess quantity of fuel injected into a combustion chamber;
a low atmospheric pressure; and
a low engine temperature.

13. The apparatus of claim 9 wherein the at least one sensor comprises at least one of:

- an intake manifold temperature sensor; and
- an intake manifold pressure sensor.

14. An apparatus for controlling an intake engine valve capable of variable closing timing, comprising:

- at least one sensor operable to determine an engine operating condition indicative of white smoke production, the at least one sensor operable to transmit at least one signal as a function thereof;

- an engine valve controller coupled with the at least one sensor to receive the at least one signal, the engine valve controller operable to transmit a first signal indicative of a desired timing for the closing of the intake engine valve as a function of the at least one signal indicative of white smoke production;

- wherein the first signal is indicative of a first crank angle when the at least one sensor is indicative of an engine operating condition not indicative of white smoke production; and

- wherein the first signal is indicative of a second crank angle when the at least one sensor is indicative of an engine operating condition indicative of white smoke production, the second crank angle being advanced with respect to the first crank angle; and

- a variable intake valve actuator operable to close the intake engine valve as a function of the first signal.

15. The apparatus of claim 14, further comprising:

- at least one sensor operable to determine a second engine operating condition and to transmit at least one signal indicative thereof; and

wherein the engine valve controller is further operable to transmit the first signal as a function of the at least one signal indicative of the second engine operating condition.

16. The apparatus of claim 15 wherein the second engine operating condition comprises at least one of:
an excess quantity of fuel injected into a combustion chamber;
a low atmospheric pressure; and
a low engine temperature.

17. The apparatus of claim 14 wherein the at least one sensor comprises at least one of:
an intake manifold temperature sensor; and
an intake manifold pressure sensor.